PLANNING CASE STUDIES

TAB 2

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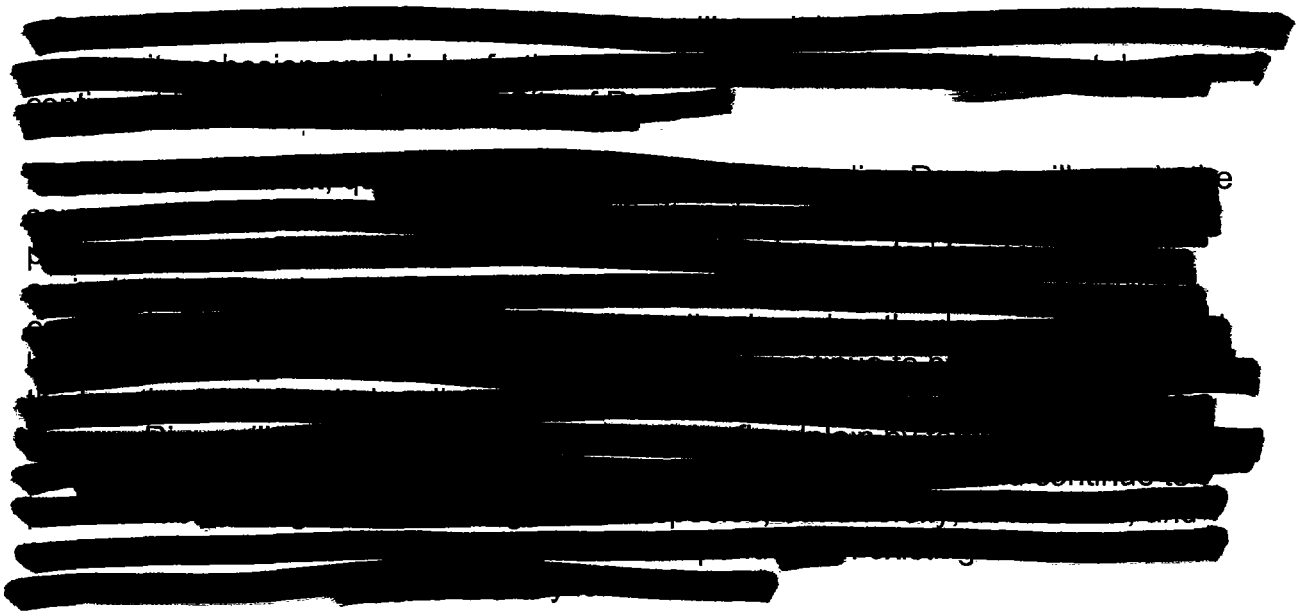

The future without project condition was based on the following assumptions:

1. The city of Roseau will continue to belong to the National Flood Insurance Program and will follow all rules and regulations associated with being in that program.

2. Future flood damages will remain unchanged. The assumption is that the damages eliminated through structure buyouts would be offset by damages to new development. A number of structures were removed following the 2002 flood and it is expected that no structures would be removed in future buyouts except following extreme events. The damages avoided by future buyouts for study purposes will be assumed to be offset by new development which will follow floodplain development guidelines and be damaged rarely, however the quantity of houses will be much greater.

3. The existing emergency levee system was analyzed and credit was given in certain reaches to varying elevations; these levees will remain in that condition for the future. See geotechnical appendix (Appendix G) for more information.

4. The city of Roseau and the Roseau River Watershed District are pursuing significant internal drainage projects: (a.) and (b) will be completed prior to the completion of the recommended plan. The effects of these projects have been factored into the plan formulation for the proposed project.

   a. West Intercept Project. This project will divert overland flows coming from the west of the city to the north to the old Roseau Lake bottom.

   b. West side storm water system. This system will divert storm water into a large storm water basin, with a pump station being used for continuous

operation. This project is under construction.

c. East side storm water protection will connect the three main storm sewer outlets and will eventually direct flows into a storage area north of town. Currently, the storm outlets are pumped with portable pumps. The current use of pumps is sufficient during floods.

5. No other currently proposed or anticipated regional projects would significantly alter the current flooding problem in the area.

Specific Objectives, Opportunities, and Concerns

At strategic points in plan formulation, important briefings and/or conferences were held with participation from the District design team, non-Federal sponsors, and interested State and Federal agency representatives. These communications and conferences were intended to insure that policy issues and critical formulation decisions about the project would be fully understood by all shareholders, adjustments to plans would be made wherever practical, and the project formulation would be informally confirmed before moving into the next phase of the project formulation and/or design. In this way, the study objectives, opportunities, and concerns have been identified, and a number of design improvements have been incorporated into the recommended plan.

The water resource related problems and opportunities associated with the larger context basin-wide and subbasin area were presented in the August 2003 Section 905(b) analysis for the Roseau River subbasin (see that report for detailed basin-wide perspectives of problems and opportunities). The project delivery team made efforts to collect and summarize basin-wide problems and opportunities through reconnaissance phase coordination with stakeholder and interagency groups. In addition, discussions with the public, city, State, watershed, and county officials have identified specific localized objectives, concerns, problems, and opportunities for incorporation into the Roseau project formulations. These concerns/problems were first identified in the Section 905(b) report and revised throughout the planning process. The revised problems, opportunity, and planning constraints are shown below.

PRIMARY PROBLEM – The city of Roseau is vulnerable to flooding from both spring snowmelt and rainfall events, and additional flood protection is needed to permanently protect the city from these frequent events.

As an example, on June 9-11, 2002, intense rain fell over the Roseau River basin, dumping an extraordinary amount of water into the study area (as much as 14 inches of rain fell in some locations). This water quickly collected and drained into the Roseau River, overflowing the city's emergency levee system and flooding most of the area. All the structures in town with the exception of the high school and several manufacturing buildings were flooded. The flood damages were devastating, with significant damage to downtown

businesses and private residences. City services were affected significantly for months. An estimated $50 million in damages to city public and hospital buildings, streets, and public utilities occurred. More than 50 homes, many owned by low-income families, had to be demolished. The Roseau County Museum, Interpretive Center, City Hall, and Library also needed to be demolished. This major flood lasted for several weeks, with heavy impacts on more than 80 percent of the city. Total damages for this single event have been estimated at more than $120 million and have resulted in major hardships to the entire city.

PROBLEM – The city of Roseau relies heavily on temporary emergency levees, which are in poor condition, leaving the city vulnerable to levee failures and catastrophic flooding.

After the temporary levee systems in Roseau were overtopped during the 2002 flood, local concern grew about reliance on the city's temporary levee systems for permanent protection. Strong local support was shown for alternative solutions that would minimize further social impacts from flooding and permanent solutions (for example, local residents fear that permanent setback levees would significantly affect the community and would also make the existing housing shortage more acute). As a result of these concerns, the Corps analyzed several possible diversion plans that would reduce or eliminate reliance on temporary levees in the city.

PRIMARY OBJECTIVE – To define an implementable permanent flood damage reduction project that would significantly reduce the long-term risk of catastrophic flood damages to Roseau. Such a project needs to be technically feasible from engineering and economic perspectives. The NED plan may not be implementable because of its downstream effects; however, the recommended LPP plan would be implementable.

OBJECTIVE – An important study objective is that the recommended flood damage reduction plans need to fit into long-term regional flood damage reduction goals (long term a number of local and State sponsored plans are being pursued to reduce flooding throughout the Roseau River subbasin).

The recommended plan fits with the regional flood damage reduction plans and could be complemented by the implementation of those plans. The local watershed district and city are pursuing plans to assist with drainage issues in the basin.

PLANNING CONSTRAINT – A key objective for the non-Federal sponsor is that the project would not induce damages to areas upstream or downstream of the study area and that damage to the "opposite side of the river" from any proposed project features would not occur or is minimized.

In response to this constraint, hydraulic project design criteria were established to avoid flood damage reduction actions that would induce higher stages upstream or downstream. This design has been incorporated into the recommended LPP plan by the addition of storage areas to the NED plan.

PLANNING CONSTRAINT – Poor riverbank and levee foundation stability are problems in the project area.

From an engineering perspective, the major geotechnical constraint is the potential for poor riverbank and levee foundation stability. The instability is caused by a combination of geologic and geomorphologic conditions in the area. A typical location where stability is of greatest concern is on the outside of a meander in the river, where erosion forces are highest. The erosional nature of the river, combined with the weak lacustrine soils deposited in the geologic past, contributes to the riverbank and levee foundation stability problems throughout the study area. Levees located near or on the outside of meanders would need to be set back from the riverbank, resulting in removal of houses and other related structures, resulting in social impacts.

PLANNING CONSTRAINT – An environmental issue that could affect project design is the potential presence of hazardous, toxic, or radioactive waste (HTRW) materials.

To assess the study area for potential HTRW materials and for other contaminated materials that may not meet the strict definition of HTRW materials (as defined in ER 1165-2-132), an environmental site history, phase I environmental site assessment and phase I field investigation were completed for the study area in May 2005. The investigations indicated that, if the diversion plan were selected, no further investigation was recommended.

CONCERN – The project area could potentially have historically or culturally significant sites, which are common near riverbanks in the region.

Construction of a flood damage reduction project could affect historically/culturally significant sites in the current project alignment. The extent of the impacts is not yet fully defined; the planning and design phases will evaluate such effects and seek to avoid or minimize any damages to such sites. A detailed cultural analysis will be completed in the plans and specifications phase. This inventory and evaluation will be accomplished very early in the planning, engineering, and design phase of implementation and will continue to be fully coordinated with the State Historic Preservation Officer (SHPO). If significant sites are identified, the final designs would be refined to avoid, minimize, or, if unavoidable, mitigate project related impacts. Preliminary evaluations and coordination with the SHPO show that the likelihood of cultural or historic sites along the project alignments is minimal.

CONCERN– Federally designated threatened species may have habitat in the project area.

Three federally designated threatened species (bald eagle, Canada lynx, and gray wolf) are listed as being present in Roseau County. These species and their critical habitat needs will be carefully considered in the alternative selection and design phases to avoid and/or minimize impacts on these species. It has been determined that the proposed east diversion (NED plan) would not contain critical habitat for the three threatened species. See the environmental assessment (Appendix E) for more information.

CONCERN - Fish passage in the river is an important issue for many agencies involved in the coordination of this plan.

The U.S. Fish and Wildlife Service (USFWS), the Minnesota Department of Natural Resources (MnDNR), the Corps of Engineers, and other management agencies have made considerable efforts to restore or maintain fish passage on the Red River and its tributaries. Care to prevent blocking fish passage on the Roseau River is a formulation constraint and was considered in developing the NED plan. A pilot channel in the diversion channel was analyzed and considered for fish passage; it was determined that this feature would not be feasible.

LOCAL CONCERN – Citizens and city officials are concerned about the probable negative spiral effect that another major flood or floods would have on the community. Specifically, if a major flood breached the existing temporary levee system, many structures would be damaged to the point where they would need to be condemned and removed. Another traumatic flood event with damages at Roseau would be difficult to overcome. From social and economic perspectives, the concern is that future significant flood damages would significantly decrease available housing, decrease community and neighborhood cohesion, adversely affect local property value and the tax base, and likely result in a decline in the community population. It could also have adverse effects on regionally significant business, especially the Polaris plant in Roseau.

OPPORTUNITY – To identify and analyze structures in and around the river that contribute to the flooding problems.

As an example, during the 2002 flood, considerable stage increases were associated with the existing in-town railroad bridge. The local desire is to remove the bridge or enlarge the embankment opening at that bridge to help reduce flood stages in town. This problem was evaluated as part of this feasibility study, and no modifications to the railroad bridge have been determined to be incrementally feasible, nor were modifications to any other structures.

OPPORTUNITY – An opportunity to pursue recreation, ecosystem restoration, and aesthetic features in the project area exists.

The Corps and the city of Roseau conducted public and design team workshops to look at potential future community recreation and environmental quality measures. As a result of these discussions, the city asked that recreation, ecosystem restoration, and aesthetic features be evaluated and integrated into plan formulation. These potential features have been evaluated, and recreation has been included in the recommended plan.

OPPORTUNITY – The city of Roseau has fiscal and political support from the State of Minnesota, increasing the financial resources available for this plan.

Water resource studies conducted by Federal, watershed, State, and local levels of government have identified flooding at Roseau as a critical problem in the Red River basin.

Accordingly, Minnesota has taken steps to assist flood-prone cities, including Roseau, in funding Federal flood damage reduction studies and in preparing detailed design reports and plans and specifications. The State has also indicated a willingness to assist in the construction of project features to substantially reduce the city's financial costs. The combined financial resources of identified non-Federal and Federal sponsors make a significant permanent flood damage reduction project possible.

OPPORTUNITY – Historically/culturally significant structures could be protected from high risk of flooding as a result of implementing a major permanent project. This project would provide an opportunity to protect those structures from future floods.

OPPORTUNITY – Establish or improve the riparian corridors along waterways (including ditches); encourage the use of native vegetation. Native vegetation will be used in the recommended project area. Further opportunities will be limited because ecosystem restoration features will not be pursued.